

REMARKS

The Examiner is thanked for the allowance of claim 27. The Examiner is also thanked for indicating that claims 5-8, 20, 23, 24, 32-35, 47, 50, and 51 contain allowable subject matter. Additionally, the Examiner is thanked for the performance of a thorough search and for accepting the drawings filed on May 31, 2001.

By this Amendment, claims 1, 4, 14, 28, 31, and 41 are amended. No claims have been cancelled or added. Hence, claims 1-53 are pending.

35 U.S.C. §112, SECOND PARAGRAPH

The Office Action rejects claims 13 and 40 under 35 U.S.C. §112, second paragraph, as being indefinite, because “said step of automatically allocating” and “the resource” lack antecedents. Accordingly, claims 13 and 40 are being amended by replacing references to “allocating” with references to “adjusting”, and references to “resources” with references to “storage space”, in accordance with the interpretation of the Office Action. Therefore, the rejection of claims 13 and 40 under 35 U.S.C. §112, second paragraph, is obviated by the above amendments.

35 U.S.C. §102(e)

The Office Action rejects claims 1-4, 9-19, 21, 22, 25, 26, 28-31, 36-46, 48, 49, 52, and 53 are rejected under 35 U.S.C. §102 (e) as being anticipated by Beaven et al. (U.S. Patent No. 6,675,321).

CLAIMS 1 AND 27

Claims 1 and 27 now recite,

storing, in a storage space that has a particular amount of storage dedicated to circular buffer for storing undo information, ...; and
automatically adjusting the particular amount of storage that is dedicated to the circular buffer by adjusting at least one of the number of segments in the plurality of segments, and the sizes of the plurality of segments based on the usage.

Thus, in Claims 1 and 27 there is a particular amount of storage used for storing undo information, and the amount set aside for undo information may be automatically changed based on usage. In contrast, although Beaven discloses placing extent files within log 20, Beaven et al. never discusses (1) whether a particular amount of storage area is set aside for log 20, and (2) never discusses whether a particular amount that is set aside is ever adjusted based on usage. Even if *arguendo* Beaven were to disclose changing the size of log 20, there is no disclosure of setting aside a particular amount of storage of log 20 before adjusting it. Additionally, even if *arguendo* Beaven were to disclose setting aside a particular amount of storage, there is no disclosure of adjusting the size of log 20. Whether or not the number or the size of the extent files in log 20 changes, the size of log 20 may remain constant no matter the usage or may not ever have a particular pre-allocated size.

Further, Claims 1 and 27 now specify that the undo information is stored in a circular buffer (in FIG. 1B, undo block 140a is depicted as a circular buffer, for example). In a circular buffer the insertion point for new data automatically wraps around to the beginning of the buffer upon reaching the end. When such a wrap around occurs, the undo information is still valid and usable. In contrast, in the prior art and the detailed description sections of Beaven et al. a key point operation is performed upon reaching the end of an extent file. In the key point operation (described in column 1, line 59, through column 2, line 9), all of the

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old active data is rewritten into an extent file starting at the beginning of the extent file. In the prior art section, the old active data is rewritten to at least the first of the same extent files in which they were originally stored. In the detailed description, the old active data is rewritten to a new extent file (see column 4, lines 44-52, for example). Either way, however, after the keypoint operation, the insertion point for new data is not the beginning of an extent file, but is after the old active data that has been rewritten. Thus, in Beaven et al. the insertion point for new data does not automatically wrap around, and Beaven et al. does not disclose a circular buffer for storing the undo information.

CLAIMS 4 AND 31

The Office Action (at page 5) stated,

As per claims 4 and 31, the examiner is regarding a *period of time* to be when a log record is written to an extent file. Thus, every time a log record is written the system of figure 3 monitors to see whether the current extent file is full and if it is, to allocate an additional extent file for the next log record.

In other words, the Office Action uses the time period associated with writing a record as the claimed series of time periods during which usage is monitored, and the Office Action also uses the monitoring of usage as the checking for the end of the file. However, as now amended, Claims 4 and 31 recite,

the step of automatically adjusting is based at least on a comparison between a usage of a first period of time and a usage of a second period of time.

The writing of a record to a file, and then checking if the file is full is not a “comparison of usage”, because the usage is not disclosed to be compared to anything. Instead a check is made for the end of the file.

CLAIMS 14 AND 41

Claims 14 and 41 recite,

a first entity of the plurality of entities is associated with a first segment of the plurality of segments; and
said step of automatically adjusting the plurality of segments further comprises increasing a size of the first segment in response to a request from the first entity by allocating an additional amount of the storage space to the first segment.

Thus, in Claims 14 and 41, a first segment is increased in size in response to a first entity issuing a request. The first entity is one of the plurality of entities about which claim 14 recites "storing...undo information for removing changes that are being made by a plurality of entities". Thus, the first entity is one of the plurality of entities that "made" "changes" that the undo information is for removing. In other words, in Claims 14 and 41 the same entity that made a change is the entity from which a request comes that results in increasing the size of a segment.

The Office Action (at page 6) stated,

As per claims 14 and 41, the examiner is considering the log record 21A as being a--first entity-- associated with extent file 21 (--first segment--) of the plurality of segments (22, 23, etc). Beaven states in column 1, lines 44-48, that the --cushion-- file can be allocated as a supplement to a --first segment-- when the segment is full and there is a shortage of disk space. Thus, the examiner is considering the --cushion-- file to be the --additional amount of storage space-- in the system that can be used to increase the --size-- of the --first segment-- when there is a shortage of disk space and the extent file is filled with log records.

Thus, the Office Action equates log record 21A with the "first entity", extent file 21 with "the first segment", and the "cushion file" with the additional amount of storage space that is used to increase the size of the first segment. However, all that is stated in column 1, lines 44-48, cited above, regarding the cushion file, is

A spare extent file known as a "cushion" file is also pre-allocated. This cushion file can be used as an extent file instead of creating a new extent file in the event that the log runs short on disk storage.

In contrast to the implications of the allegation of the Office Action, there is no disclosure of either the cushion file or any other extent file changing size. Additionally, the cushion is "pre-allocated". Consequently, even were the cushion file considered part of another extent file the size of the two combined is fixed. Further, using two files is different than merging two files into one file. There is no disclosure of merging the cushion file into another extent file to get a larger file or otherwise increasing the size of the extent file.

Further, even if arguendo log record 21A were the second entity, Claims 14 and 41 recite "increasing a size of the first segment in response to a request from the first entity". Thus, the increase in size would have to be "in response to a request from the first entity". However, a log record (which the Office Action associates with the first entity) cannot make a request. Therefore, there is no disclosure of an increase in size "in response to a request from" log record 21A. Additionally, the passages cited by the Office Action do not disclose another entity issuing a request resulting in the increase in size as a response, and therefore Beaven et al. do not disclose the request as issuing from the entity that made the change, as required in Claims 14 and 41. In other words, in contrast to Claims 14 and 41, in Beaven et al., if an extent file fills up, use is made of special extent file, the cushion file, which is kept in reserve in case the extent file fills up. However, the use of the cushion file is only disclosed to be in response to extent file filling up and is not disclosed to be in response to an entity (that "made" a "change") issuing a request.

INDEPENDENT CLAIMS 1, 4, 14, 28, 31, AND 41

The “entities” claimed are not the records of Beaven et al.

The Office Action states (at the paragraph bridging pages 3 and 4),

Beaven teaches in column 1, lines 14-36, that a log file is used to track a plurality of log records (--entities--) that make changes to a system during a transaction. These log records are stored in extent files (--segments--) within the storage space of log file 20 of figure 2. Figure 2 shows a plurality of extent files 21, 22, and 23 comprised on a log file 20. Each extent file is comprised of log records 21A, 21B; and 21C. These log files are stored on a storage space of a non-volatile storage device (column 1, lines 27-29).

Thus, the Office Action associates the claimed “entities” with Beaven et al.’s “records”. The Applicants concede that Beaven et al. discloses storing data in records located in an extent file. However, claim 1 recites

storing...undo information for removing changes that are being made by a plurality of entities, wherein the undo information for each entity of the plurality of entities is stored in a segment of a plurality of segments within said storage space

Claims 4, 14, 28, 31 and 41 have similar recitations. Thus, the “entities” in Claims 1, 4, 14, 28, 31 and 41 are those entities via which the “changes” “are being made”. Additionally, the undo information is “undo information for removing [those] changes”. The Office Action has not explained what it views as the “changes” made by the “entities”. Apparently, the Office Action associates the transactions of Beaven et al. as the change. In a database management system, a record is a set of information. A record may be a row of a table, for example. Thus, the transactions of Beaven et al. are stored within log records. In contrast to claim 1, although the record contain information about transactions, the records (which the Office action associates with the claimed entities), however, do not make the transactions (which are presumably associated with the claimed changes). This dilemma in the Office Action’s interpretation of the claims is not resolved by the passages cited, as explained below.

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Specifically, column 1, lines 14-21, state,

In certain data processing operations it is useful to maintain a log file related to ongoing data processing activity. For example, in the transaction processing field, it is common to maintain a log file of ongoing transactions involving a particular data processing apparatus so that if the data processing apparatus should fail for some reason (e.g., power failure) the log file can be used to recover the data processing apparatus back to the state it was in, with respect to processing the transactions, before the failure.

Although this passage discusses maintaining a log of ongoing transactions, column 1, lines 14-21 do not discuss “records” per se, and therefore do not disclose the records making transactions or otherwise making changes. Similarly, column 1, lines 27-29, states,

Such log files are typically maintained on a direct access non-volatile storage device (such as a hard disk drive) so that the data will not be lost in case of a power failure.

Although this passage discusses saving log files in non-volatile storage, there is not any discussion of “records” per se, and therefore this passage does not discuss the records making transactions or otherwise making changes.

Although FIG. 2, cited above, shows records 21A, 21B, and 21C stored in “first extent file 21”, there is no disclosure of these records making transactions or otherwise making changes.

Use of Beaven et al.’s cushion file is not a change in the size of the claimed segment

The Office Action (at page 4) states,

Further, the examiner is considering the size of the extent file to be the size of the extent file plus the --cushion-- data (column 1, lines 44-47). Thus, the size of the extent files can be reduced since when a key pointer function is performed. Thus the size of the extent file data is reduced to fit in the size of a normal extent file (column 2, lines 1-6).

However, as discussed above, there is no actual disclosure in column 1, lines 44-46, of increasing the size of extent file 21 with the cushion file. Presumably both extent file 21 and

the cushion files remain separate extent files of the same size as they were initially prior to the extent file 21 filling up.

Regarding the other passage cited above, column 1, line 66, through column 2, line 10, states

While the key-pointing operation is being carried out, concurrent accesses to the log for other purposes (updating, reading etc.) are blocked. Via the key-pointing operation, the log file is re-organized such that all of the active data (DA) is stored in log records between the key-point start record and the key-point end record. This means that all extent files which logically come prior to the extent file which contains the key-point start record can be deleted.

However, although the last sentence of the above passage recites that “extent files” are “deleted”, there is no disclosure in this passage of any extent files (including the cushion file) changing in size.

Additionally, column 1, lines 38-40, state

The size of an extent file can be configured by the operator and log records are written to an extent file up to the configured size, at which point a new extent file is created in order to store more log records.

The implication of this passage is that after the size of the extent file is configured by the operator (a human being), the extent file remains at that size until the operator again configures the size of the extent file. In contrast, Claims 1, 4, 14, 28, 31 and 41 recite “automatically adjusting” the storage space. Additionally, the operator configuring the size of the extent implies that the extent file does not change size based on the usage being monitored, but by input from a human operator. Similarly, column 2, lines 49-59, state

According to a first aspect, the present invention provides ... writing means for writing log records into the current extent file until the current extent file cannot store any further log records; and key-pointing means for performing a key-pointing operation on the written log records when the writing means has reached the point where no further log records can be stored in the current extent file.

Thus, after the extent file is full, a key-point operation is performed. The implication of this passage is that the extent file is not adjusted in size as a result of filling (but instead a key point operation is performed). There is no disclosure in the passages cited by the Office Action of the extent file changing in size at any other time, thereby implying that the extent files do not change in size as a result of usage.

DEPENDENT CLAIMS (AND REMAINING FEATURES OF THE INDEPENDENT CLAIMS)

Claims 2, 3, 9-19, 21, 22, 25, 26, 29, 30, 36-40, 42-46, 48, 49, 52, and 53 depend either directly or indirectly from one of claims 1, 4, 14, 28, 31, and 41 are allowable for at least the same reasons. Each of the remaining features of the independent claims and each of the dependent claims 2, 3, 9-19, 21, 22, 25, 26, 29, 30, 36-40, 42-46, 48, 49, 52, and 53 contain subject matter that is independently patentable. However, in view of the deficiencies in the reference relied upon above, the remaining features in the claims will not be argued at this time to expedite the prosecution.

OBJECTIONS TO CLAIMS

Claims 5-8, 20, 23, 24, 32-35, 47, 50, and 51 were objected to as containing allowable subject matter, but as being dependent upon rejected claims. Each of claims 5-8, 20, 23, 24, 32-35, 47, 50, and 51 depends either directly or indirectly upon one of independent claims 1, 4, 14, 27, 31, and 41. Therefore, since claims 1, 4, 14, 27, 31, and 41 are allowable, the objection is obviated.

CONCLUSION

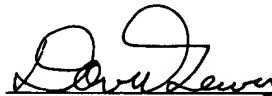
The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

No extension fee is believed to be due. However, to the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. The Commissioner is authorized to charge any fee that may be due in relation to this application to our Deposit Account No. 50-1302.

Respectfully submitted,

HICKMAN PALERMO TRUONG & BECKER LLP

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David Lewis
Patent Agent, Reg. No. 33,101

1600 Willow Street
San Jose, California 95125-5106
Telephone No.: (408) 414-1213
Facsimile No.: (408) 414-1076

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on May 3, 2004
(Date)

by


Teresa Austin